NATIONAL INSTITUTE OF TECHNOLOGY KARNATAKA

SURATHKAL, MANGALORE - 575 025

Course Code – CS111

Course Name – Computer Programming Lab

Lab - 03

Date – May 25, 2021

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Decision making- and Branching constructs

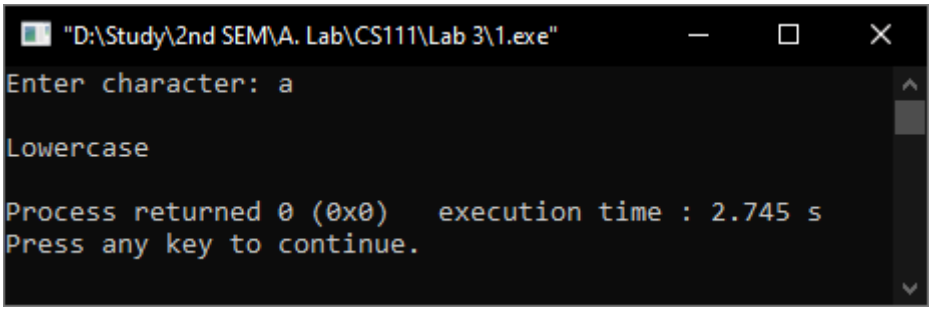
Question – 1

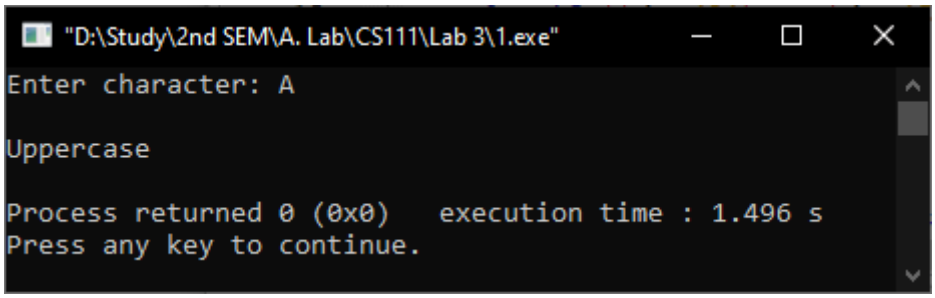
To determine whether a character entered is in lowercase, uppercase, digit or a special character

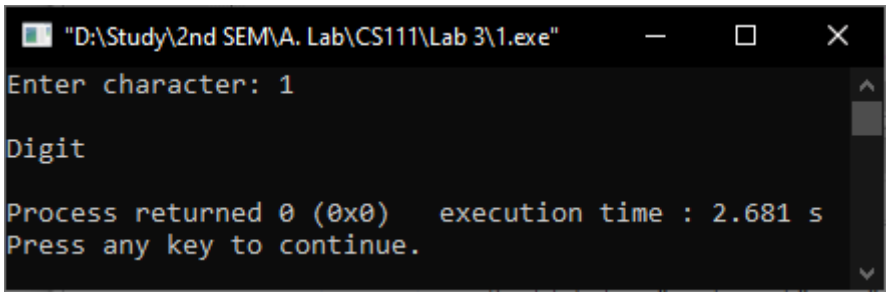
Answer

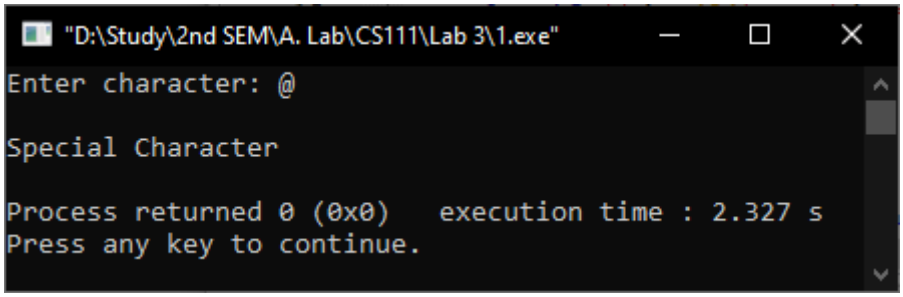
```c
#include<stdio.h>
int main()
{
    char ch;
    printf("Enter character: ");
    scanf("%c",&ch);
    if((ch>='0') && (ch<='9'))   // number
    {
        printf("\nDigit\n");
    }
    else if ((ch>='a')&&(ch<='z'))   //lowercase
    {
        printf("\nLowercase\n");
    }
    else if ((ch>='A') && (ch<='Z'))  //uppercase
    {
        printf("\nUppercase\n");
    }
    else                          //otherwise special character
    {
        printf("\nSpecial Character\n");
    }
    return 0;
}
```

Output


"D:\Study\2nd SEM\A. Lab\CS111\Lab 3\1.exe"
Enter character: a
Lowercase
Process returned 0 (0x0) execution time : 2.745 s
Press any key to continue.


"D:\Study\2nd SEM\A. Lab\CS111\Lab 3\1.exe"
Enter character: A
Uppercase
Process returned 0 (0x0) execution time : 1.496 s
Press any key to continue.


"D:\Study\2nd SEM\A. Lab\CS111\Lab 3\1.exe"
Enter character: 1
Digit
Process returned 0 (0x0) execution time : 2.681 s
Press any key to continue.


"D:\Study\2nd SEM\A. Lab\CS111\Lab 3\1.exe"
Enter character: @
Special Character
Process returned 0 (0x0) execution time : 2.327 s
Press any key to continue.

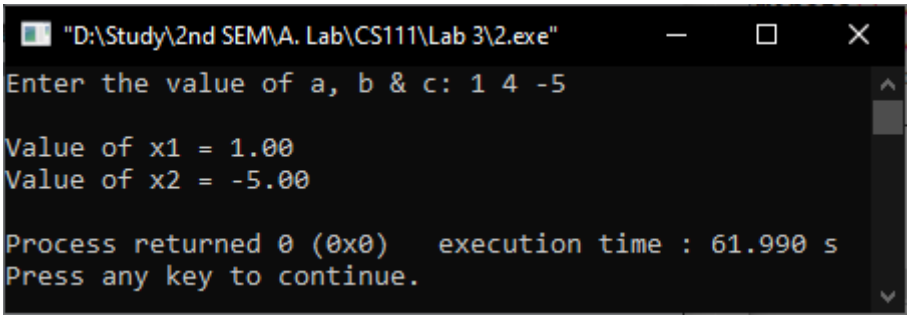
Question-2

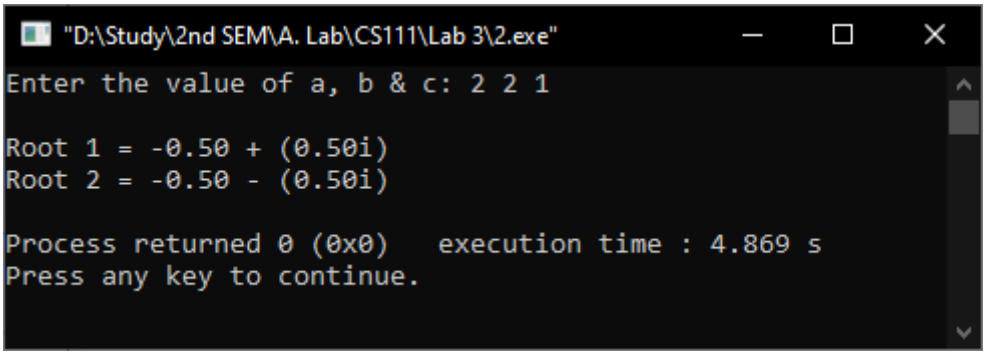
Find the roots of quadratic equation

Answer

```c
#include <stdio.h>
#include <math.h>
int main()
{
    float a, b, c;
    printf("Enter the value of a, b & c: ");
    scanf("%f %f %f", &a, &b, &c);
    if (a != 0)     //a^2 + b + c = 0 so a!=0
    {
        float discriminate, root_1, root_2;
        discriminate = pow(b, 2) - 4 * a * c;
        if (discriminate >= 0)
        {
            root_1 = (-b + sqrt(discriminate)) / (2 * a);
            root_2 = (-b - sqrt(discriminate)) / (2 * a);
            printf("\nValue of x1 = %.2f\n", root_1);
            printf("Value of x2 = %.2f\n", root_2);
        }
        else
        {
            float real, imaginary;
            real = (-b) / (2 * a);
            imaginary = (sqrt(-(discriminate))) / (2 * a);
            printf("\nRoot 1 = %.2f + (%.2fi)\n", real, imaginary);
            printf("Root 2 = %.2f - (%.2fi)\n", real, imaginary);
        }
    }
    return 0;
}
```

Output


"D:\Study\2nd SEM\A. Lab\CS111\Lab 3\2.exe"
Enter the value of a, b & c: 1 4 -5
Value of x1 = 1.00
Value of x2 = -5.00
Process returned 0 (0x0)   execution time : 61.990 s
Press any key to continue.


"D:\Study\2nd SEM\A. Lab\CS111\Lab 3\2.exe"
Enter the value of a, b & c: 2 2 1
Root 1 = -0.50 + (0.50i)
Root 2 = -0.50 - (0.50i)
Process returned 0 (0x0)   execution time : 4.869 s
Press any key to continue.

Question – 3

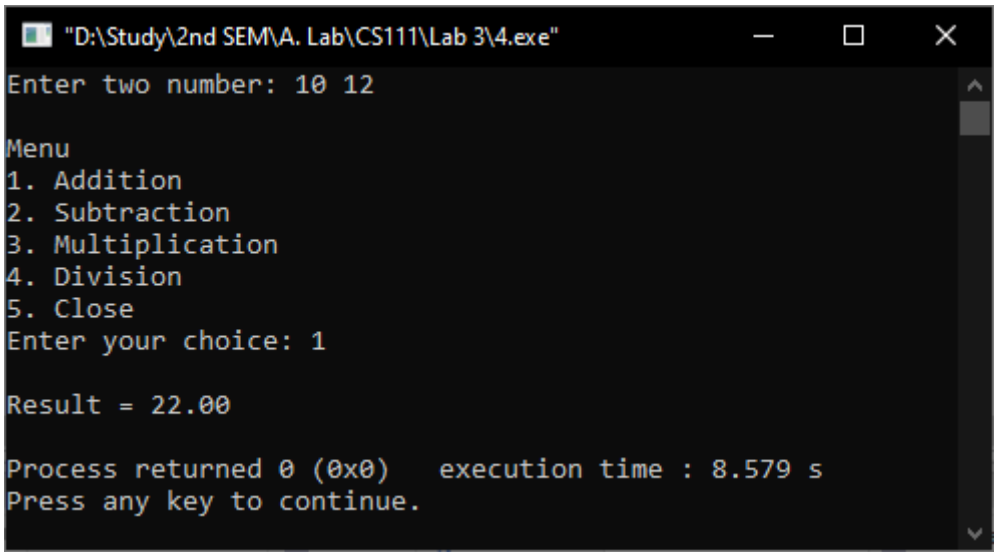
Write a menu driven program to demonstrate the simple arithmetic calculator

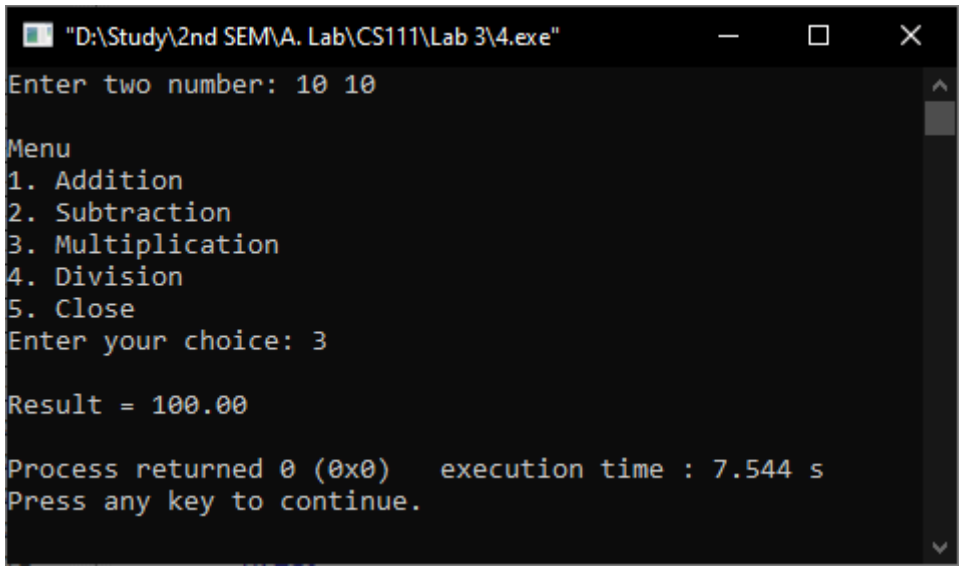
Answer

```c
#include<stdio.h>
int main()
{
    float num1, num2;
    printf("Enter two number: ");
    scanf("%f %f", &num1, &num2);
    printf("\nMenu\n");
    printf("1. Addition\n");
    printf("2. Subtraction\n");
    printf("3. Multiplication\n");
    printf("4. Division\n");
    printf("5. Close\n");
    int choice;
    printf("Enter your choice: ");
    scanf("%d",&choice);
    float result;
    switch(choice)
    {
    case 1:
        result = num1 + num2;
        break;
    case 2:
        result = num1 - num2;
        break;
    case 3:
        result = num1 * num2;
        break;
    case 4:
        result = num1 / num2;
        break;
    case 5:
        printf("\nClosed\n");
```

```
        return 0;
    default:
        printf("\nInvalid Input\n");
        return 0;
    }
    printf("\nResult = %.2f\n",result);
    return 0;
}
```

Output





Decision making and looping constructs

Question – 1

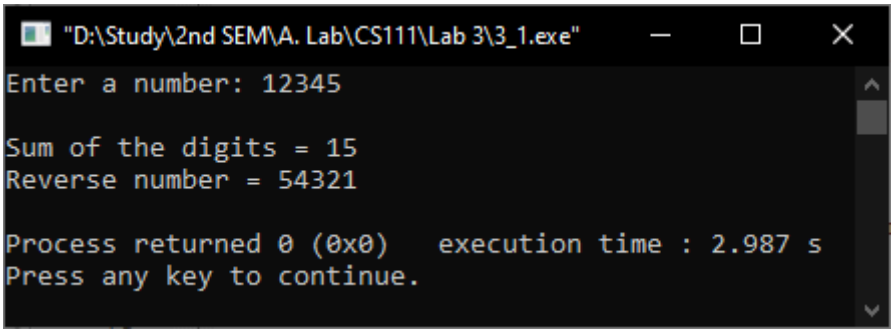
Program to reverse the digits of a number and to find the sum of the digits

Answer

```c
#include<stdio.h>
int main()
{
    int num;
    printf("Enter a number: ");
    scanf("%d", &num);
    int remainder, sum=0, reverse=0;
    while (num != 0)
    {
        remainder = num % 10; //separate last digit
        sum += remainder;     //add
        reverse = reverse*10 + remainder;  //reverse
        num /= 10;
    }
    printf("\nSum of the digits = %d\n",sum);
    printf("Reverse number = %d\n",reverse);
    return 0;

}
```

Output



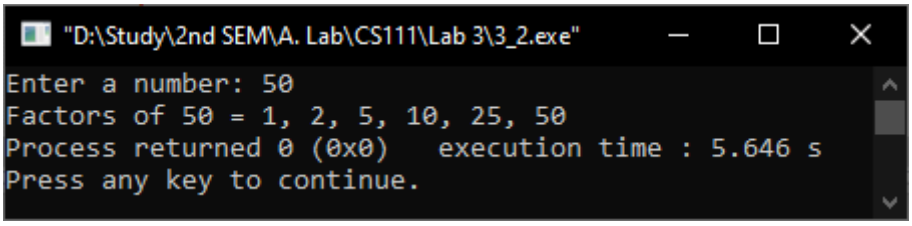
Question-2

Program to find factors of a given number

Answer

```c
#include<stdio.h>
int main()
{
    int num;
    printf("Enter a number: ");
    scanf("%d",&num);
    printf("Factors of %d = ",num);
    int i;
    for(i=1; i<=num; i++)
    {
        if(i==num)
        {
            printf("%d",i); //remove comma after last factor
        }
        else if (num%i==0)
        {
            printf("%d, ",i);
        }
    }
    return 0;
}
```

Output



Question-3

Program to find the prime and non-prime numbers between a given range

Answer

```
#include<stdio.h>
int main()
{
    int lower, upper, i, j, k=0, z=0, len, num, prime_num;
    printf("Enter the lower and upper bound: ");
    scanf("%d %d", &lower, &upper);
    len = (upper - lower)-
1;          //total number between upper and lower
    int prime[len], not_prime[len];
    num = lower+1;
    for(i=0; i<len; i++)
    {
        if(num<2)
        {
            num = 2;        //lowest prime number is 2
            continue;
        }
        prime_num = 1;       //prime number? 1 means yes
        for(j=2; j<num; j++)
        {
            if(num % j == 0)
            {
                prime_num = 0;   // prime number? 0 means false
                break;
            }
        }
        if(prime_num == 0)
        {
            not_prime[z] = num;  // storing non-prime in an array
            z++;
        }
        else
```

```
        {
            prime[k] = num;    //storing prime in an array
            k++;
        }
        num++;
    }
    printf("Prime = ");
    for(i=0; i<k; i++)
    {
        printf("%d ",prime[i]);
    }
    printf("\nNot prime = ");
    for(i=0; i<z; i++)
    {
        printf("%d ",not_prime[i]);
    }
    return 0;
}
```

Output